CLAIMS

1. A method for the demodulation of radio navigation signals (s(t)) transmitted in spread spectrum and comprising a data channel which is modulated by a navigation message and a pilot channel which is not modulated by a navigation message, the data channel and the pilot channel being combined into one multiplexing scheme in order to modulate a carrier, this method consisting in subjecting the signals of the pilot and data channels to despreading processing and in demodulating the despread data signal (r_d) in order to obtain the navigation message $\langle d(t) \rangle$, characterized in that the demodulation of the despread data signal (r_d) used to obtain the navigation message $\langle d(t) \rangle$ is performed with the aid of the carrier (r_p) obtained from the despreading processing of the pilot channel.

2. The method as claimed in claim 1, characterized in that the pilot channel and the data channel of the signal to be demodulated are time-multiplexed.

3. The method as claimed in claim 1, characterized in that the pilot channel and the data channel of the signal to be demodulated are phase-multiplexed.

4. The method as claimed in claim 1, characterized in that the pilot channel and the data channel of the signal to be demodulated are multiplexed in accordance with an ALTBOC scheme.

5. The method as claimed in claim 1, characterized in that the pilot channel and the data channel of the signal to be demodulated are multiplexed in accordance with a scheme in which the carrier contains at least the data channel and the pilot channel of the signal to be demodulated.

6. The method as claimed in any of claims 1 to 5, characterized in that the despreading processing is performed by code tracking or estimation processing, combined with carrier phase or frequency tracking or estimation processing.

7. The method as claimed in claim 6, characterized in that the carrier tracking processing is performed with the aid of a frequency-lock loop (FLL) and the code tracking processing is performed with the aid of a delay-lock loop (DLL).

8. The method as claimed in any of claims 1 to 7, characterized in that it is applied to the demodulation of satellite navigation signals of the GPS-IIF L5, L2C

type, or to the demodulation of satellite navigation signals transmitted by the GALILEO system, or transmitted by ground stations, by modernized GLONASS satellites or by COMPASS or QZS satellites.

9. A receiver for radio navigation signals transmitted in spread spectrum and comprising a data channel which is modulated by a navigation message and a pilot channel which is not modulated by a navigation message, the receiver comprising a despreading and tracking device comprising a spreading code generator (23) which supplies spreading codes (E_P, L_P, P_P, E_D, L_D, P_D, NH_data, NH_pilot) and means (35^1 to 35^{12} and 37^1 to 37^{12}) for applying the spreading codes to the signals of the pilot channel and data channel in order to obtain despread pilot and data signals, characterized in that it comprises a demodulator which uses the despread pilot signal to demodulate the despread data signal in order to obtain the navigation message (d).

10. The receiver as claimed in claim 9, characterized in that it comprises means for estimating or tracking the frequency or phase of the despread pilot channel signal.

11. The receiver as claimed in claim 10, characterized in that it comprises a frequency-lock loop (FLL) for tracking the pilot signal and a delay-lock loop (DLL) which drives the spreading code generator (23).

12. The receiver as claimed in claim 11, characterized in that the frequency-lock loop (FLL) comprises a discriminator (19) of extended arctangent form.

13. The receiver as claimed in claim 11 or 12, characterized in that the frequency-lock loop (FLL) comprises a first-order or second-order loop filter (20) which is adapted to the dynamics of the received signals.

14. The receiver as claimed in any of claims 11 to 13, characterized in that the output of the filter (20) of the frequency-lock loop (FLL) is coupled to the delay-lock loop (DLL), the delay-lock loop comprising a zero-order loop filter (22).

15. The receiver as claimed in any of claims 11 to 14, characterized in that the delay-lock loop (DLL) comprises a discriminator (21) which is applied to the pilot signals and to the data signals, the data signals being weighted by a coefficient which depends on the signal-to-noise spectral density ratio (C/N_0) of the received signals.

16. The receiver as claimed in any of claims 11 to 15, characterized in that the frequency-lock loop (FLL) is designed to receive Doppler velocity aid from a navigation system (29).